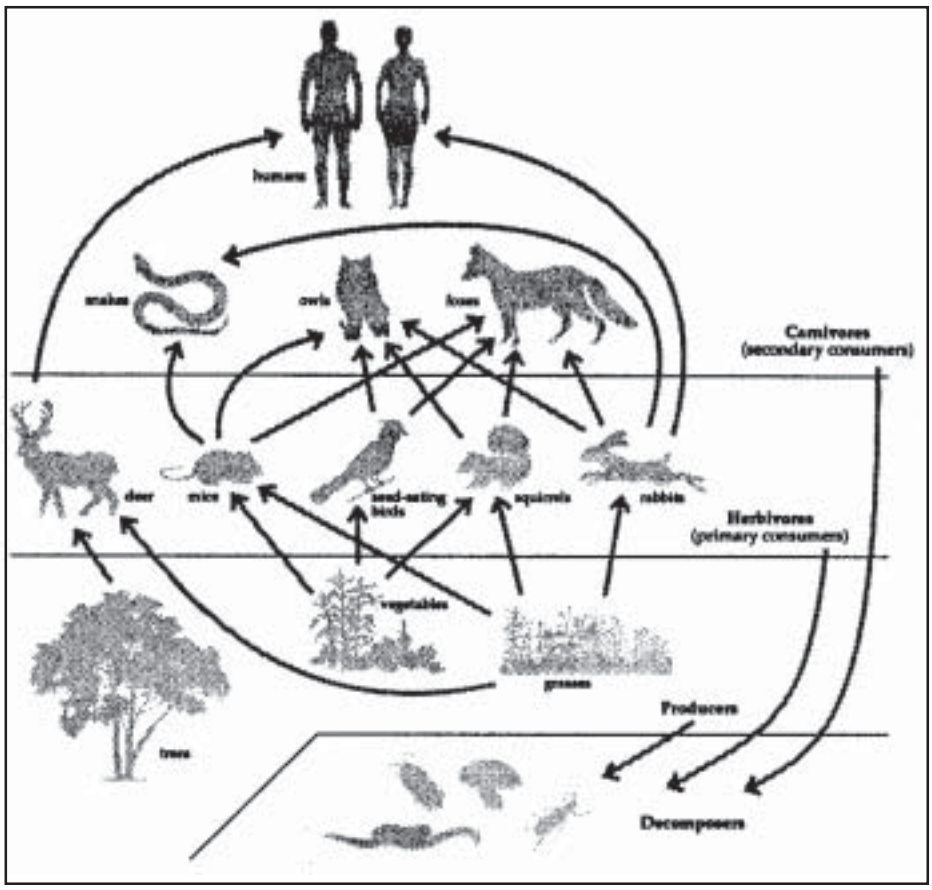
UNIT 2
Iowa's Wildlife Habitats

What is Habitat?

Habitat is where an animal lives. It must contain food, water, shelter, and space in an arrangement that benefits the animal. Each animal has different habitat requirements. Some may need a special food or a certain amount of space to survive.

An **ecosystem** is an association of organisms (living things), both plants and animals, each occupying a certain position or **ecological niche** (role played by an organism), inhabiting a common environment, and interacting with each other and the nonliving environment. Iowa has many habitat types, each with unique animals and plants **adapted** (specialized) to live there.



Every organism in an ecosystem is dependent on other organisms. A **food chain** illustrates this interdependency. (e.g., A mouse eats plants and seeds and is eaten by a skunk. A great-horned owl eats the skunk. It may die and be decomposed to soil by insects, fungi, and bacteria.) Plants are **producers**, the mouse is **prey**, and the skunk and great-horned owl are **predators**. Fungi, insects, and bacteria are **decomposers**. All producers, consumers, and decomposers are dependent on each other because they are part of a **food web** (an interlocking pattern of food chains).

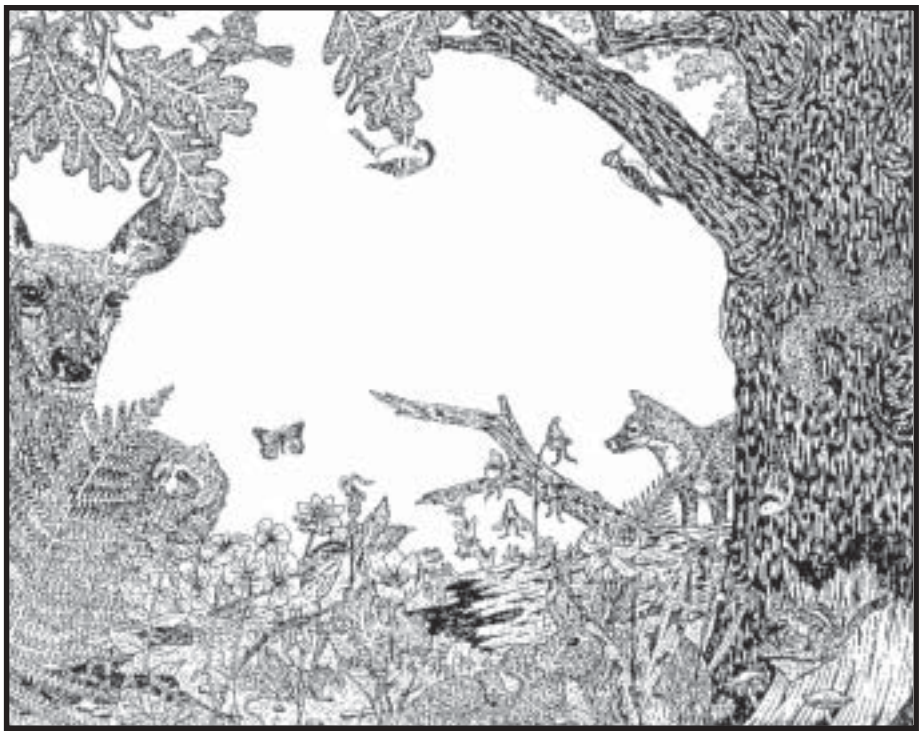
Every animal or plant has adaptations that allow it to live in a specific habitat. Each organism fills a niche (role) in that habitat. Producers, predators, prey, and decomposers depend on each other and are connected in a web of life. All strands of the web are affected if one strand is destroyed.

Wildlife populations depend on quality habitat with adequate food, water, shelter, and space. Iowa has a variety of habitats that still support a diversity of wildlife species even though they have been altered and/or reduced greatly by human activity. We must protect, conserve, and expand Iowa's remaining habitats in order to preserve and enhance the present diversity of wildlife.

Forests

Iowa has diverse forests that provide a wide range of wildlife habitat. Forests support a wide array of birds, mammals, insects, amphibians, and reptiles.

Trees dominate a forest. Iowa has four main types of forest habitats. **Upland forests** are the most common. They are found on ridge tops and other areas above the reach of floodwaters. They contain mainly oak and hickory trees adapted to dry or well drained, sunny locations. Black walnut, basswood, white ash, and sugar maple are found in more moist areas. Cooper's hawks need mature oak-hickory forests to hunt for small birds. Broad-winged hawks hunt for snakes, frogs, and rodents on the forest floor. Squirrels nest in hollow upland trees and eat acorns and hickory nuts.



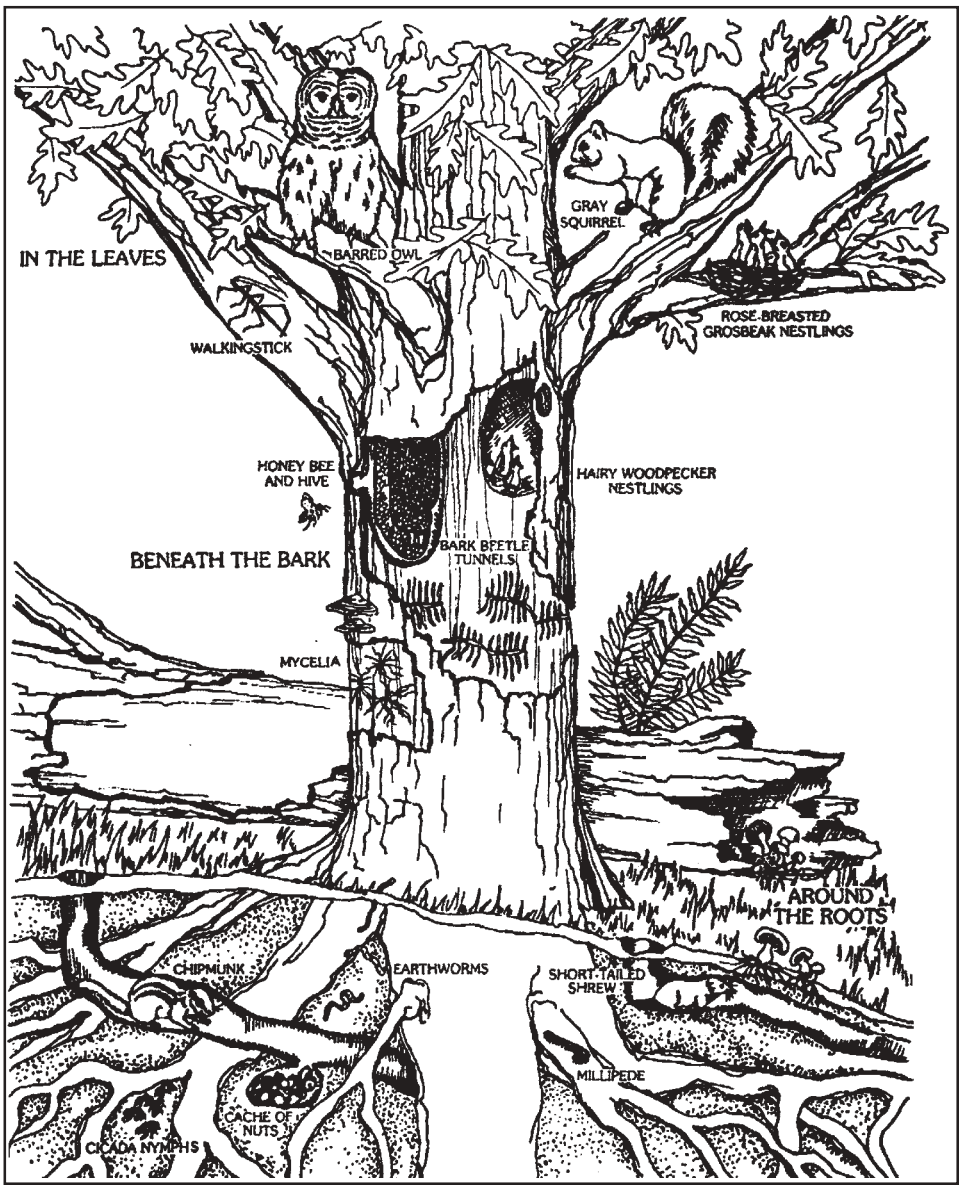
Bottomland forests are found in floodplains along major rivers and streams. Silver maples, green ash, and hackberry are found in moist bottomland forests. Cottonwoods, willows, and boxelders grow nearest to the water. They have roots adapted to periodic flooding. Red-shouldered hawks nest in bottomland trees and hunt in small backwater marshes. Western earth snakes live near streams where they find a plentiful supply of earthworms. Raccoons and opossums live in cavities in large trees.

Savannas consist of scattered large burr or white oak trees with wide spreading branches that reach out over semi shade-tolerant prairie grasses and wildflowers. The shrub layer is absent. Savannas are maintained by fires (and perhaps limited grazing) that keep smaller trees and shrubs from growing and crowding larger trees. Savannas were important to prairie elk in pre-settlement times because they offered shade. Many of Iowa's savannas were converted to other land uses or, through succession and fire suppression, developed into a more dense forest. Eastern bluebirds and common barn owls nest in savannas. Five-lined skinks use savanna stumps and rotting logs for refuge.

Evergreen forests of white pine, balsam fir, and red cedar grow on algific (cool air) slopes in northeast Iowa. Iowa Pleistocene snails and plants such as monkshood and golden saxifrage are adapted to these forests cooled by air flowing from ice caves in the hills. Some species in the algific forest probably were widespread during the Ice Age, but now exist only in small areas where the climate is similar to these earlier conditions.

All forests are composed of layers:

- The **overstory** (canopy), or uppermost level, is comprised mainly of large, dominant trees (oak, hickory, basswood, maple) that usually grow best in full sun. Woodpeckers hunt for insects in the crevices in their bark. Barred owls nest in **cavities** (hollows or holes) usually found in larger, mature trees.
- The next lower layer is the **understory**. It is comprised of more **shade-tolerant** (can grow well under low light conditions) trees (hackberry, ironwood, chokecherry) that provide food for wildlife.
- The **shrub layer** contains berry-producing shrubs (gooseberries, raspberries). Climbing vines (wild grape, Virginia creeper, poison ivy) and saplings (young trees) are part of this layer. Hummingbirds, bees, and butterflies pollinate shrub flowers.
- The **herbaceous layer** contains mostly non-woody plants (grasses, sedges, ferns, and wildflowers). Woodland wildflowers (bloodroot, trout lilies, Virginia waterleaf, columbine, trillium, etc.) bloom very early, responding to sunlight reaching the forest floor before leaves appear on overstory trees. Chipmunks and mice search the herbaceous layer for fallen seeds and berries. Fox snakes hunt for small mammals. Frogs and salamanders scurry about looking for insects in rotting logs and leaf litter.



- The **ground layer** (forest floor) houses fungi, mosses, lichens, and liverworts. A variety of invertebrates (insect larvae, termites, centipedes) live in the ground layer and help decompose leaves, fallen trees, plants, and animals.

Each type of animal living in Iowa's forests has unique adaptations (e.g., keen senses of smell, sight, and hearing, camouflage) that help it survive in this habitat.

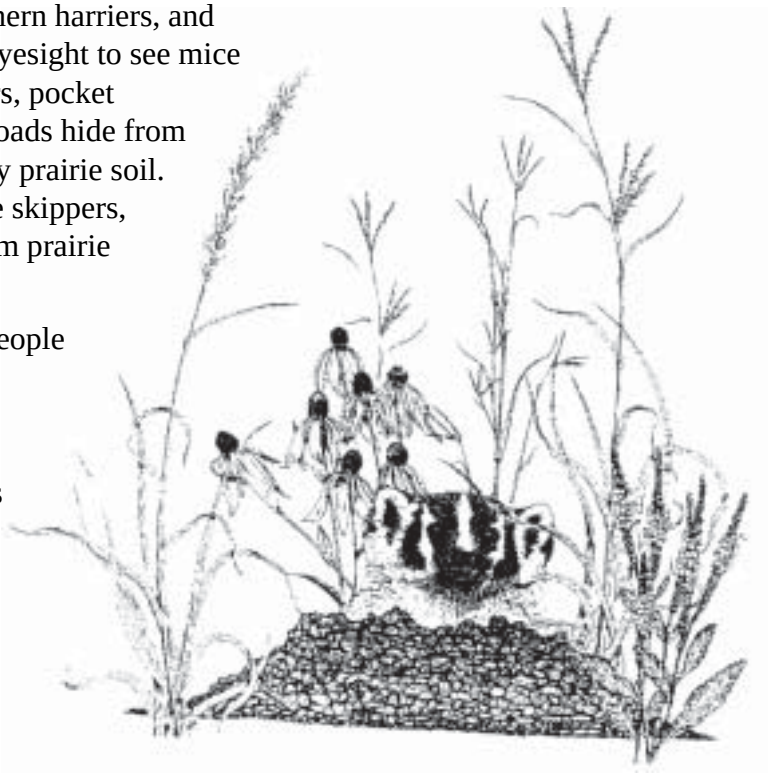
Prairies

Savannas and prairies are adapted to periodic fires and dry, sunny conditions in Iowa's plains and the Loess Hills. Prairie once was the dominant habitat in Iowa with savannas dotting the expanse of tall prairie grasses. Each habitat had its own unique community of plants and animals.

Prairie plants are adapted to periodic drought and sunny conditions. Their leaves usually are very small and may have a waxy or "hairy" coating to prevent excess water loss. Their deep reaching root systems hold soil and can reach underground water and nutrients to sustain them through periods of drought.

Iowa's prairies are composed of tall or mid-sized grasses (e.g., big bluestem, Indian grass, switch grass, little bluestem, side oats grama). Wildflowers (e.g., compass plants, purple coneflowers, maximillion sunflowers, pasque flowers) thrive here. Over 200 different plants inhabit native prairies. A site's soil type determines which plants grow there. (e.g., A dry sandy site has a different grouping of wildflower and grass species than a heavy black-soil prairie.) Prairies provide food and cover for many birds, mammals, and insects.

Prairie animals have several adaptations that enable them to survive in the sometimes harsh environment. The red fox has a well-developed sense of smell to find prey in tall grasses. Short-eared owls, northern harriers, and American kestrels have sharp eyesight to see mice and snakes in tall grass. Badgers, pocket gophers, and plains spadefoot toads hide from the sun in burrows dug in loamy prairie soil. Regal fritillary butterflies, ottoe skippers, and monarchs gather nectar from prairie flowers.



Prairie dogs, which many people associate with the prairie community, were never very numerous in Iowa. They are better adapted to the short grass prairies further west.

Iowa's remaining prairies must be managed carefully to preserve their unique plants and animals. Historically, wildfire and grazing bison and elk prohibited growth of trees and shrubs and regenerated prairie grasses. The great elk and bison herds are gone and fires have been suppressed. Prairie management today includes prescribed burns, rotational grazing, and cutting, mowing, or herbicide treatment to control woody plant growth and regenerate prairie grasses and wildflowers.

Many government agencies and private organizations reconstruct prairies because they are suited to Iowa's soils and climate and they are an important part of our heritage. **Local ecotype** (from nearby prairie remnants) seed is used whenever possible. This is the most effective way to establish prairies similar to those that were lost and insure genetic material from local species is maintained. Invertebrates from native prairies also are transplanted to newly established areas because eggs and larvae hitchhike with the harvested plant material.

Edge

Edge is an area of transition between two or more distinct habitats. The most distinct edge habitat is between forest and grassland. The edge of a forest receives more sunlight than under the forest canopy, so more shrubs and grasses are found here.

Many animals benefit from forest edge habitats. Rabbits and white-tailed deer prefer to live where forests and grasslands meet because there is a greater diversity of food as well as places to hide. Red-tailed hawks perch in trees on the forest edge to search for mice in adjacent fields.

Farms provide edge habitat–woodlots, fencerows, crop fields, hay fields, stream buffers, pastures. Songbirds (e.g., eastern bluebirds, loggerhead shrikes, yellow warblers) nest in woodlot trees and hunt for insects in open pastures.

Aquatic Habitats

Iowa has several aquatic communities, each with their own distinct plants and animals. Wetlands, lakes and ponds, and rivers and streams are typical aquatic habitats in Iowa. Government agencies and private organizations are taking steps to assure water quality and conserve these crucial aquatic habitats.

Wetlands

Wetlands have saturated soil for various lengths of time during the growing season. They vary in shape, size, and location. They usually are low spots in the land where water gathers naturally. Depressions created as the last glaciers receded thousands of years ago make the most common kind of wetland in Iowa, prairie potholes.

All wetlands have three things in common: shallow water (hydrology), anaerobic (without oxygen) soil known as hydric soil, and specialized plants. The types and arrangements of these three components are used to differentiate between wetland types. Wetlands include swamps, potholes, sloughs, marshes, bogs, fens, seeps, oxbows, shallow ponds, and wet meadows.

Wetlands are the most productive of Iowa's biological communities. They rank just below tropical rainforests in productivity. Coontail, duckweed, water lilies, and cattails are just a few plants found in wetlands. Fish (e.g., bullheads, carp) live in wetlands where water does not freeze to the bottom in winter. Muskrats build lodges with cattails. Mink, opossum, raccoon, and white-tailed deer come to wetlands to hunt and/or drink. Great blue herons, belted kingfishers, and gulls eat wetland fish. Bank swallows dive for insects flying over the water. Ducks, geese, and swans nest in wetlands and raise young. They also rest in wetlands during migration. Painted turtles sun themselves on logs. Snapping turtles hunt below the water's surface. Insects (e.g., damselflies, dragonflies, mayflies, mosquitoes), frogs, toads, and other amphibians have aquatic stages in their life cycles that are found in wetlands.

Wetlands recharge aquifers, cleanse incoming water of pollutants, and provide flood protection by holding and storing runoff and rainfall. They also act as fish nurseries, attract migrating birds and bird watchers, and provide quality hunting and trapping experiences.

Some wetlands dry up during drought years, exposing seeds (of emergent plants) in the soil to the sun so they sprout. The wetland is transformed into a dense marsh of cattails and reeds when rainfall returns. Standing water drowns some of the vegetation so the wetland gradually becomes more open. Another drought sets the cycle into motion again.

cattail marsh

Lakes and Ponds

Lakes and ponds are deeper and have less standing vegetation than wetlands. Iowa has more than 87,000 farm ponds, mostly in the southern two-thirds of the state. Naturally occurring lakes are found in northwest and north-central Iowa, but most lakes are formed by damming rivers, streams, or valleys. Many plants and animals found in wetlands are found in these waters also. Lakes generally have a more diverse fishery than ponds because they are larger and the water is deeper. They also provide brood rearing and resting areas for migratory birds.

Rivers and Streams

Rivers and streams are abundant in Iowa and support a variety of plants and animals. Many Iowa river corridors are lined by trees. These provide roosts for bald eagles, herons, and other fish-eating birds. Bank swallows commonly bore holes for their homes in river banks. River otters hunt for fish. Beavers build dams that create new wetland habitats.

River fish and plants are well equipped for life in flowing water. Plants are firmly anchored. Smallmouth bass, northern pike, and channel catfish have streamlined bodies, reducing their resistance to the current.

For more information about Iowa's aquatic habitats see *An Iowa Supplement to Project WILD Aquatic*.

Human-Built Environments

Human-built environments can provide habitat for animals. These can include agricultural lands, yards, and even urban areas.

Windbreaks shield houses from wind and weather. They contain a variety of overstory, understory, and shrub vegetation. Fox squirrels use large windbreaks with conifers for shelter. Rabbits and ring-necked pheasants may live in brushy areas.

buffer strip

Tree plantations are uniform rows of trees planted for a future harvest. Blue spruce or scotch pine may be planted for Christmas trees. Black walnut trees can be planted to harvest for lumber. Tree plantations benefit wildlife by serving as shelter and possibly providing food.

Agricultural lands (crop fields, hay fields, pastures, and grassed road ditches) can provide a mixture of food, water, and shelter for wildlife. Transition areas between fields, pastures, and road ditches can provide important edge habitat. Red-tailed hawks hunt for mice in pastures and hay fields. White-tailed deer, ducks, geese, and others eat crop leftovers.

People have created or restored habitat by managing building complexes, parks, forests, ponds, and even backyards for wildlife. Many animals respond to these efforts. Peregrine falcons use nest structures placed on tall buildings. Screech owls eat backyard rodents and insects. Backyard feeders attract blue jays, black-capped chickadees, dark-eyed juncos, American goldfinches, and northern cardinals. Rock doves are found on city streets and in many city parks. Raccoons and opossums have adapted to urban environments and scavenge through garbage cans or take up residence in unused chimneys. Some bats hibernate in attics and chimneys. Garter snakes and toads live in gardens. Ruby-throated hummingbirds and monarch and tiger swallow-tailed butterflies may visit gardens if the right flowers are planted.

White-tailed deer are becoming more abundant in urban environments. Available food and shelter and absence of predators in urban parks have contributed to an over-population of white-tailed deer. They enter yards and parks to browse on shrubs and young trees, often damaging plant communities. They also create traffic hazards.

Deer have become a serious nuisance in parts of several urban areas. Regulated use of firearms within city limits and public opinion regarding lethal deer management techniques make deer control a contentious issue. Special archery hunts with qualified hunters who harvest a specific number of deer in problem areas help control high populations. State parks also use special hunts to thin the deer herd and protect the forest understory from over-grazing. The goal is to limit deer herds to levels that do not impact plant communities or interfere with human activities.

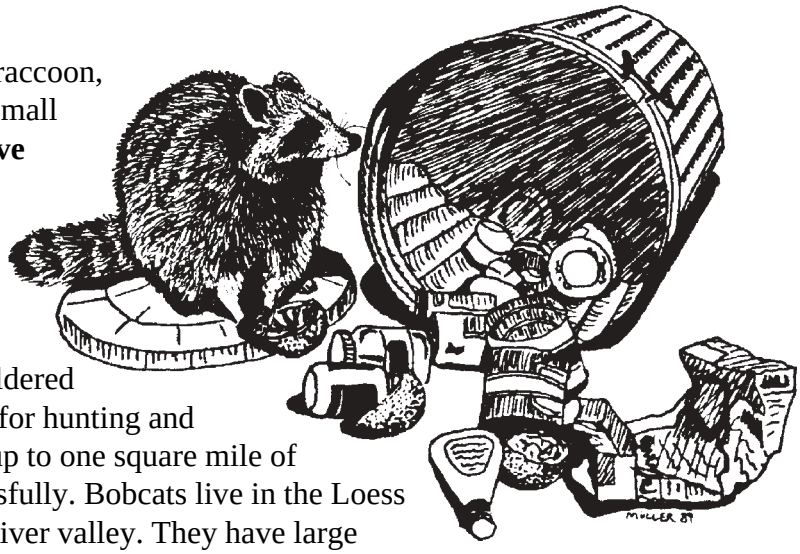
white-tailed deer

Habitat: Quality, Quantity, and Arrangement

Habitat includes food, water, shelter, and space. The numbers and kinds of wildlife in an area are directly related to the quality, quantity, and arrangement of the habitat.

Habitat Fragmentation and Loss

Habitat fragmentation occurs when large tracts of habitat are broken into smaller pieces by housing developments, roads, agriculture, and other factors, often referred to collectively as "land use." It increases the amount of edge in a habitat. Edge is beneficial to some animals (e.g., ring-necked pheasants, rabbits), but is detrimental to others. Biologists often must look to a larger geographic area (landscape) to determine or resolve factors impacting wildlife population.



Some animals thrive near humans (e.g., raccoon, opossum, house mouse) and can survive in small fragmented habitats. Others are **area sensitive** (need large, uninterrupted tracts of habitat without human disturbance). Bison and elk need large prairie tracts for grazing. Greater prairie chickens need them to establish display grounds (**leks**) and safe nesting areas. Cooper's hawks and red-shouldered hawks (predators) require large forest tracts for hunting and nesting. A red-shouldered hawk pair needs up to one square mile of bottomland forest to rear their young successfully. Bobcats live in the Loess Hills of western Iowa and the Des Moines River valley. They have large territories for hunting.

Many **Neotropical migrants** (birds that migrate to areas such as Mexico, the Caribbean, and South America) require large tracts of habitat to nest successfully. Cowbirds are **brood parasites** (lay their eggs in another bird's active nest). The host bird may end up raising a baby cowbird and none of its own chicks. Habitat fragmentation gives cowbirds and edge predators (e.g., crows, jays, skunks, feral cats) access to interior forest nesting birds that evolved in their absence and have no defenses against them. Wood thrush, Tennessee warbler, and rose-breasted grosbeak populations have declined because of forest fragmentation.

Habitat loss and fragmentation can affect migrating birds on their nesting grounds, wintering grounds, or even during migration. Thousands of geese and ducks stop at Iowa's wetlands, rivers, ponds, and lakes each year to rest and feed. Destruction of habitat decreases the amount of space available to them. Birds waste valuable energy searching for other suitable habitat or may be crowded into smaller areas, increasing the threat of disease and loss to predation.

Black-and-white warblers, scarlet tanagers, and bobolinks may not survive to return to their nesting grounds in the Midwest if adequate wintering and migrating habitat is not available. They need safe rest stops along their **flyways** ("highways" birds follow each year to reach their destinations) as well as wintering areas.

Succession

Succession in a plant community can be defined as a process of changes in species composition of the community over time. Succession is ongoing. It is easiest to see after a disturbance in an area leaves open ground. This disturbance may be natural–fire, flood, storm, or glacier. Humans also cause disturbances by clearing land for agriculture or urban development.

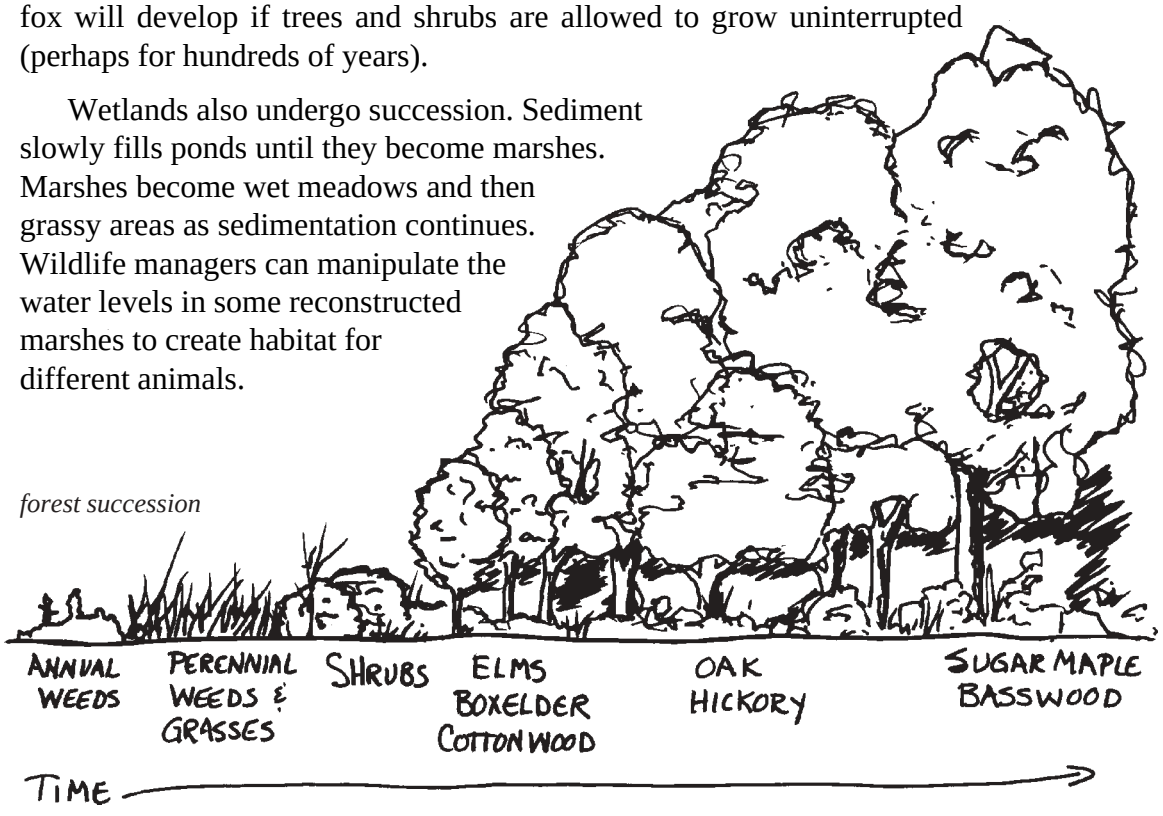
If disturbed areas are left alone, the first plants to appear are **pioneer species**. These species have colonizing characteristics such as rapid growth, abundant seed production, and seeds that are dispersed easily. They do not grow well in shade or where other plants are established. They add organic matter to the soil and stabilize the site. This creates the right conditions for other plants to grow.

Many factors influence what type of stable plant community (**climax community**) develops on a certain site. Soil type, climate, and animals in the area may influence the vegetation. In Iowa, the climax community that develops on a disturbed area can be either a forest or prairie. It may take hundreds of years for a climax community to develop. Species composition of a climax community may vary over time.

A large prairie habitat can support bison, elk, and prairie chickens. It will no longer support bison and elk if it is disturbed (e.g., turned into an agricultural field), but may support ring-necked pheasants and mourning doves.

An agricultural field may be abandoned so annual weeds and grasses grow. This type of habitat is beneficial for quail, rabbits, and some songbirds. Shrubs and tree seedlings will begin to appear if the field remains untouched. These seeds might be in the soil or carried in by birds or wind. White-tailed deer, red fox, and tree sparrows eventually will move into this type of habitat. A forest habitat supporting turkeys, barred owls, and gray fox will develop if trees and shrubs are allowed to grow uninterrupted (perhaps for hundreds of years).

Wetlands also undergo succession. Sediment slowly fills ponds until they become marshes. Marshes become wet meadows and then grassy areas as sedimentation continues. Wildlife managers can manipulate the water levels in some reconstructed marshes to create habitat for different animals.



forest succession

Succession can be set back. Prairie fires kill trees so the land remains a prairie. Forests are cleared to make agricultural fields. Succession continues if the field is abandoned. Aldo Leopold, in his classic essay on game management, listed four tools (cow, plow, axe, and fire) that people can use to set back succession. People still use these tools to manipulate succession.

Arrangement

Habitat arrangement can greatly affect survival rates of certain animals. An animal might have to travel long distances, possibly crossing open, unsheltered areas, to get water–exposing it to predation. Locating food sources and thick cover or sheltered areas near one another and close to a water source can increase winter survival for pheasants and other wildlife. Biologists consider habitat size, composition, and arrangement when developing management plans for different species.

Other Materials

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ortho.gis.iastate.edu (Iowa Geographic Image Map Server–digital aerial photos, relief maps, topographic maps, and land cover maps from satellite imagery)
www.nrcs.usda.gov/technical/land/cover_use.html (National Resources Inventory maps; maps showing land use changes)

WILD Activities (grade level)

Animal Poetry (5-8)
Beautiful Basics, The (K-4)
Changing the Land (6-8)
Fire Ecologies (9-12)
From Bison to Bread: The American Prairie (9-12)
Habitat Lap Sit (5-8)
Habitat Rummy (5-8)
Migration Barriers (5-8)
Planting Animals (5-8)
Rainfall and the Forest (5-8)
Shrinking Habitat (5-8)
Urban Nature Search (5-8)
What Bear (Bird) Goes Where? (K-4)
What's That, Habitat? (K-4)
Which Niche? (5-8)
Who Fits Here? (5-8)

** Supplemental information provided for italicized activities.*